M30620T-RPD-E
M30620TB-RPD-E
User's Manual

M30620T-RPD-E: Operating voltage 2.7-5.5V
(Maximum operating frequency: 10MHz, 5V)

M30620TB-RPD-E: Operating voltage 5V
(Maximum operating frequency: 16MHz, 5V)

First Edition: May 1, 1998

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Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Preface

M30620T-RPD-E and M30620TB-RPD-E are emulation pods for M16C/62 group of Mitsubishi 16-bit microcomputers. M30620T-RPD-E/M30620TB-RPD-E is used by being connected to the PC4701 emulator (PC4701HS, PC4701L, PC4700H or PC4700L) and is controlled by the emulator debugger.

This manual mainly explains specifications and setting up of M30620T-RPD-E/M30620TB-RPD-E. For detail information about the PC4701 emulator and the emulator debugger, refer to each user's manual.

To check the components of this product, refer to "Things to Check When Unpacking" in this manual. If there is any question or doubt about this product, contact your nearest Mitsubishi office or its distributor.

To use the product properly

Precautions for Safety :

- Both in the M30620T-RPD-E/M30620TB-RPD-E User's Manual and on the product itself, several icons are used to insure proper handling of this product and also to prevent injuries to you or other persons, or damage to your properties.
- The icons' graphic images and meanings are given in "Chapter 1 Precautions for Safety". Be sure to read this chapter before using the product.

When using outside Japan

- When using in Europe, the United States, or Canada, be sure to use both the emulator and the emulation pod which meet overseas standards. EMI standards are not met when M30620T-RPD-E or M30620TB-RPD-E is used with the PC4700H or PC4700L emulator.

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Terminology

Some specific words used in this User's Manual are defined as follows:

PC4701

This means the generic name of the PC4701HS, PC4701L, PC4700H and PC4700L emulators.

PC4701 system

This means an emulator system built around a PC4701 emulator. The PC4701 emulator system is configured with the emulator main unit, an emulation pod, an emulator debugger, and a host machine.

Emulator debugger

This means a software tool to control the emulator from the host machine through an interface.

Emulator debugger: PD30 (V.3.00 Release 1 or later)
Host machine: IBM PC/AT or compatible
OS: Windows 95 or Windows NT 4.0
CPU: 486DX4-100MHz or Pentium 75MHz (or faster recommended)
Memory: 32MB or more

Target MCU

This means the microcomputer you are going to debug.

Target system

This means a user's application system using the microcomputer to be debugged.

Things to Check When Unpacking

M30620T-RPD-E/M30620TB-RPD-E consists of the following parts and manuals. When unpacking, check to see if your M30620T-RPD-E/M30620TB-RPD-E package contains all of these items.

Item	Product name and type	Quantity
1	M30620T-RPD-E or M30620TB-RPD-E (Emulation pod)	1
2	Flexible cable for connecting PC4701 emulator	1
3	Screws for connecting PC4701 emulator	2
4	FLX100 (Flexible cable for connecting target system, already connected)	1
5	FLX-100LCC (Converter board for the 100LCC package)	1
6	OSC-2 (Oscillator circuit board)	1
7	M30620T-RPD-E/M30620TB-RPD-E English user's manual (this manual)	1
8	M30620T-RPD-E/M30620TB-RPD-E Japanese user's manual	1

If any of these items are missing or found faulty, please contact the distributor. Also, if there is any question or doubt about the packaged products, contact your distributor.

CAUTION

Please keep the M30620T-RPD-E/M30620TB-RPD-E’s packing box and cushion material in your place for reuse at a later time when sending your product for repair or other purposes. Always use these packing box and cushion material when transporting the M30620T-RPD-E/M30620TB-RPD-E.

Chapter 1. Precautions for Safety

In both the M30620T-RPD-E/M30620TB-RPD-E User's Manual and on the product itself, several icons are used to insure proper handling of this product and also to prevent injuries to you or other persons, or damage to your properties.

This chapter describes the precautions which should be taken in order to use the product safely and properly. Be sure to read this chapter before using this product.

1.1 Safety Symbols and Meanings

WARNING If the requirements described in the "WARNING" section are ignored, the equipment may cause serious personal injury or death.

CAUTION If the requirements described in the "CAUTION" section are ignored, the equipment may malfunction.

IMPORTANT Notes containing important information on using this product.

In addition to the above, the following are also used:

△ means WARNING or CAUTION

Example :

CAUTION AGAINST AN ELECTRIC SHOCK

⃠ means PROHIBITED

Example :

DISASSEMBLY PROHIBITED

● means MANDATORY ACTION

Example :

UNPLUG THE POWER CABLE FROM THE RECEPTACLE.

The following pages describes the symbols "WARNING", "CAUTION", and "IMPORTANT".

1.2 Precautions for Safety

⚠ WARNING

Warning for Installation :

- Do not set this product in water or areas of high humidity. Make sure that the main unit does not get wet. Spilling water or other liquids into the main unit can cause an unrepairable damage.

Warning for Use Environment :

- This equipment is to be used in an environment with a maximum ambient temperature of 35°C. Care should be taken that this temperature is not exceeded.

⚠ CAUTION

Cautions to Be Taken for This Product :

- Do not disassemble or modify this product as personal. Disassembling or modifying this product can cause damage.
- Use caution when handling the main unit. Be careful not to apply a mechanical shock.
- Do not touch directly the connector pins of the emulator main unit or the target system connector pins with your hand.
- Do not pull the emulation pod main unit by the FLX120-RPD flexible cable or the FLX100 flexible cable for connecting the target system.
- The flexible boards FLX120-RPD and FLX100 are different from earlier models. The slits make them more flexible. However, excessive flexing or force may break conductors.
- Do not use inch-size screws for this equipment. The screws used in this equipment are all ISO (meter-size) type screws. When replacing screws, use same type screws as used on the equipment.

Caution for Installation :

- Do not place the main unit on its side when in use.

IMPORTANT

Notes on PC4701 Emulators :

- The PC4700H emulators whose serial number ends with a number cannot be used with M30620T-RPD-E/M30620TB-RPD-E. Use only products whose serial number ends with a letter of the alphabet. The serial number is on the bottom of the PC4700H.

  Example: 5KE100 … Can NOT be used with M30620T-RPD-E/M30620TB-RPD-E. Requires an upgrade.

  Example: 5LE123B … Can be used with M30620T-RPD-E/M30620TB-RPD-E.

- Do not turn off the power when downloading firmware. If the emulator is powered off in the middle of the process, it will become unable to start up normally. In cases when the power is inadvertently shut off, re-execute downloading.

Notes on Abnormal Operation :

- If the PC4701 system does not pass all self-checks (excluding when an target system error occurs), there is the possibility of trouble in the system. In such case, contact the place of purchase.

  Please take note that self-check should be executed under the following conditions.

  (1) The target system is not connected.

  (2) The Switch SW5 is set to 'L' position, SW6 to '16' (see Chapter 4).

- If the emulator malfunctions due to external interference or some other causes, follow the steps given below.

  (1) Press the system reset switch located on the front panel of the emulator.

  (2) If the emulator does not return to the normal operation despite the step (1) above, turn off the power source of the emulator, turn it on again.

Notes on Target System :

- Because the emulation pod does not have the capacity to supply power to other devices, design your system so that the emulator MCU is powered by the target system.
- Make sure that the target's supply voltage is within the MCU specification and in the range of +2.7 to 5.5V (M30620T-RPD-E) or +4.8 to 5.2V (M30620TB-RPD-E).
- Do not change power supply voltage of the target system after activating the power.
- Before turning on power to anything, check the host machine, emulator main unit, emulation pod, conversion board and target system are properly connected. Activate power to units as explained here following.

  (1) Turn on and off power to the target system, and then the PC4701 continuously.

  (2) After turning on power to the PC4701, check the Target Status LEDs on the emulator' front panel to see if the M30620T-RPD-E/M30620TB-RPD-E is ready to operate.

  - Is the power supplied? Check that Target Status LED (POWER) is on.
  - Is the reset released? Check that Target Status LED (RESET) is off.

IMPORTANT

Notes on Connecting Target System :

- When connecting the FLX100 flexible cable and the converter board, be careful not to forcibly press the connector top of the converter board. (The flexible cable and the converter board are guaranteed for only 20 insertion/removal iterations.)
- Especially be careful not to insert the converter board in the wrong direction.

Note on Reset Input from Target System :

- The reset input from the target system is accepted only during program execution (while the RUN signal lamp on the PC4701 is lit).

Note on HOLD Input from Target System :

- Input an 'L' level signal into the HOLD pin only during program execution. Doing so while the program is stopped or during run time debugging may cause the emulator to malfunction.

Note on Address 0 Access :

- With the M16C/62 group MCU, when a maskable interrupt is generated, the interrupt data (interrupt No. and interrupt request level) stored in address 0 is read out.

  Also, the interrupt request bit is cleared when address 0 is read out. Consequently, when the address 0 read-out instruction is executed or when address 0 is read out in the cause of a program runaway, a malfunction occurs in that the interrupt is not executed despite the interrupt request, because the request bit of the highest priority interrupt factor enabled is cleared.

  Therefore, with the M30620T-RPD-E/M30620TB-RPD-E, if address 0 is read out for anything other than interrupt processing, the yellow LED lights up as a warning. When this LED lights up, there is the possibility of illegal access to address 0, therefore check the program. This LED is extinguished from the emulator reset switch.

IMPORTANT

Notes on Differences between Actual MCU and Emulator :

• Emulator operation differs from mask MCU operation, as listed below:

(1) Reset condition

(2) Initial values of internal resource data at power-on

(3) Internal RAM and ROM capacities, etc.

(4) Ports $P0_0$ to $P5_7$

Of the M30620T-RPD-E/M30620TB-RPD-E's I/O ports, ports $P0_0$ - $P5_7$ are connected to the target system through the port emulation circuit inside M30620T-RPD-E/M30620TB-RPD-E.

Table 1.1 gives the device which uses these ports.

Table 1.1 The I/O device used by the ports

Port	I/O device
$P0_0$ - $P5_7$	M60074-0111FP

(5) Writing into pullup control registers 0 and 1 (addresses $03FC_{16}$ and $03FD_{16}$ respectively)

To write into pullup control registers 0 and 1 (addresses $03FC_{16}$ and $03FD_{16}$ respectively), it is necessary to write the word data from address $03FC_{16}$. This is an M30620T-RPD-E/M30620TB-RPD-E restriction.

(6) Ports $P5_0$ - $P5_3$

To enable pullup when setting bit 2 (PUR12) of the pullup register 1 to '1' in single chip mode, be sure to set the bit 2 (PM02) and bit 7 (PM07) of the processor mode register 0 to '0'. This is an M30620T-RPD-E/M30620TB-RPD-E restriction.

(7) BCLK output disable

To disable the BCLK output, it is necessary to set the BCLK output disable bit (PM07) of processor mode register 0 (address 0004_{16}) to '1' and to set bit 3 of the port P5 direction register (address $03EB_{16}$) to '0'. This is an M30620T-RPD-E/M30620TB-RPD-E restriction.

(8) Hold control

When an 'L' level signal is input to the terminal $\overline{\text{HOLD}}$ and the terminal enters the hold state, in actuality, ports $P0_0$ to $P5_2$ enter the hold state one half cycle later than the MCU (see "Chapter 7, Operation Timing").

(9) A/D converter

A/D converter characteristics differ from actual MCU characteristics because the flexible board and other elements are used between the emulation MCU and user's target.

(10) Status while the program is stopped

In a system using the PC4701, the loop iteration at the address $F8000_{16}$ establishes and maintains the status during program stop. Also, when debug commands are issued to check or edit memory data, addresses $F8000_{16}$ to $F83FF_{16}$ and addresses $F6000_{16}$ to $F63FF_{16}$ are used as work area. For this reason, when the $\overline{\text{CS0}}$ output is enabled in the microprocessor mode, the $\overline{\text{CS0}}$ signal is output.

IMPORTANT

(11) About the actual MCU output and the emulator output

Table 1.2 Differences between actual MCU and emulator outputs

Access area	Signal	Actual MCU	M30620T-RPD-E M30620TB-RPD-E	Item with different outputs
SFR area	Address	Output	Output	
	Data	Output (Floating during read operations)	Floating	*
	RD/WR	Output (WR=Low at write cycle, RD=Low at read cycle)	No output (High output fixed)	*
	CS	No output (High output fixed)	No output (High output fixed)	
	ALE	No output (Low output fixed)	Output	*
	BHE	Output	Output	
Internal RAM area Internal ROM area	Address	Previous status maintained	Output	*
	Data	Floating	Floating	
	RD/WR	No output (High output fixed)	No output (High output fixed)	
	CS	No output (High output fixed)	No output (High output fixed)	
	ALE	No output (Low output fixed)	Output	*
	BHE	No output (Previous status maintained)	Output	*
External area	Address	Output	Output	
	Data	Output (Inputs external data when reading)	Output (Inputs external data when reading)	
	RD/WR	Output (WR=Low at write cycle, RD=Low at read cycle)	Output (WR=Low at write cycle, RD=Low at read cycle)	
	CS	Output	Output	
	ALE	Output	Output	
	BHE	Output	Output	
In STOP state	Address		Output	
	Data		Floating	
	RD/WR		Output only for Read operations (Write = High output fixed)	
	CS		Output	
	ALE		Output	
	BHE		Output	

IMPORTANT

Notes on MAP Settings and References :

- For details on MAP settings and references, refer to the user's manual of the PD30 emulator debugger.
- Always set the SFR area to EXT (external).
- MAP settings when executing the RESET command

When executing the PD30 emulator debugger RESET command, this pod uses the 4 bytes from $0FFFC_{16}$ to $0FFFF_{16}$ (or $00FFC_{16}$ to $00FFF_{16}$ in expansion mode 1) as a stack area. The RESET command cannot be correctly executed when these 4 bytes cannot be read or written to. You must therefore take care using the MAP resetting procedure when the following condition (1) or condition (2) are true (excluding expansion mode 1).

(1) When the 4 bytes from $0FFFC_{16}$ to $0FFFF_{16}$ are set to EXTERNAL in a system shifting from single chip mode to memory expansion mode or microprocessor mode

(2) When the 4 bytes from $0FFFC_{16}$ to $0FFFF_{16}$ are set to EXTERNAL in a system started in microprocessor mode and there is no read/write-enabled memory in the external area.

Use the following MAP setting procedure when either of the above conditions (1) or (2) are true.

(1) Set the 4 bytes from bytes from $0FFFC_{16}$ to $0FFFF_{16}$ to INTERNAL.
↓
(2) Execute the PD30 emulator debugger RESET command.
↓
(3) Set the stack pointer.

(Example)

```
RESET:
        FCLR I
        LDC #480H, SP <- stack pointer setting
                        (STOP the program after executing this command.)
                        ↓
```

(4) Set the 4 bytes from $0FFFC_{16}$ to $0FFFF_{16}$ to EXTERNAL.

IMPORTANT

Notes on Reading MCU Internal Sources :

- When this product is configured with the emulator debugger, the following results occur when reading the registers listed in Table 1.3. Data is not displayed correctly, but internal data is not affected at all.

  (1) Real-time tracing

  Data values in the MCU internal resource read cycle are not displayed correctly.

  (2) Real-time RAM monitoring

  Data is not displayed correctly.

  This happens because data read from the MCU internal source is not output to an external point. When data is written into an MCU internal source, the data input from the external point is displayed correctly.

Table 1.3 Registers and signals

Register	Signal
Processor mode registers 0, 1	PM0, PM1
System clock control registers 0, 1	CM0, CM1
Chip select control register	CSR
Address-match interrupt enable register	AIER
Protect register	PRCR
Watchdog timer start register	WDTS
Watchdog timer control register	WDC
Address-match interrupt registers 0, 1	RMAD0, RMAD1
DMA source pointers 0, 1	SAR0, SAR1
DMA destination pointers 0, 1	DAR0, DAR1
DMA transfer counters 0, 1	TCR0, TCR1
DMA control registers 0, 1	DM0CON, DM1CON

Note on Stack :

- This product uses up to 8 bytes of stack.

Chapter 2. Introduction

M30620T-RPD-E/M30620TB-RPD-E is used by being connected to the PC4701 emulator main unit. Figure 2.1 shows the system configuration.

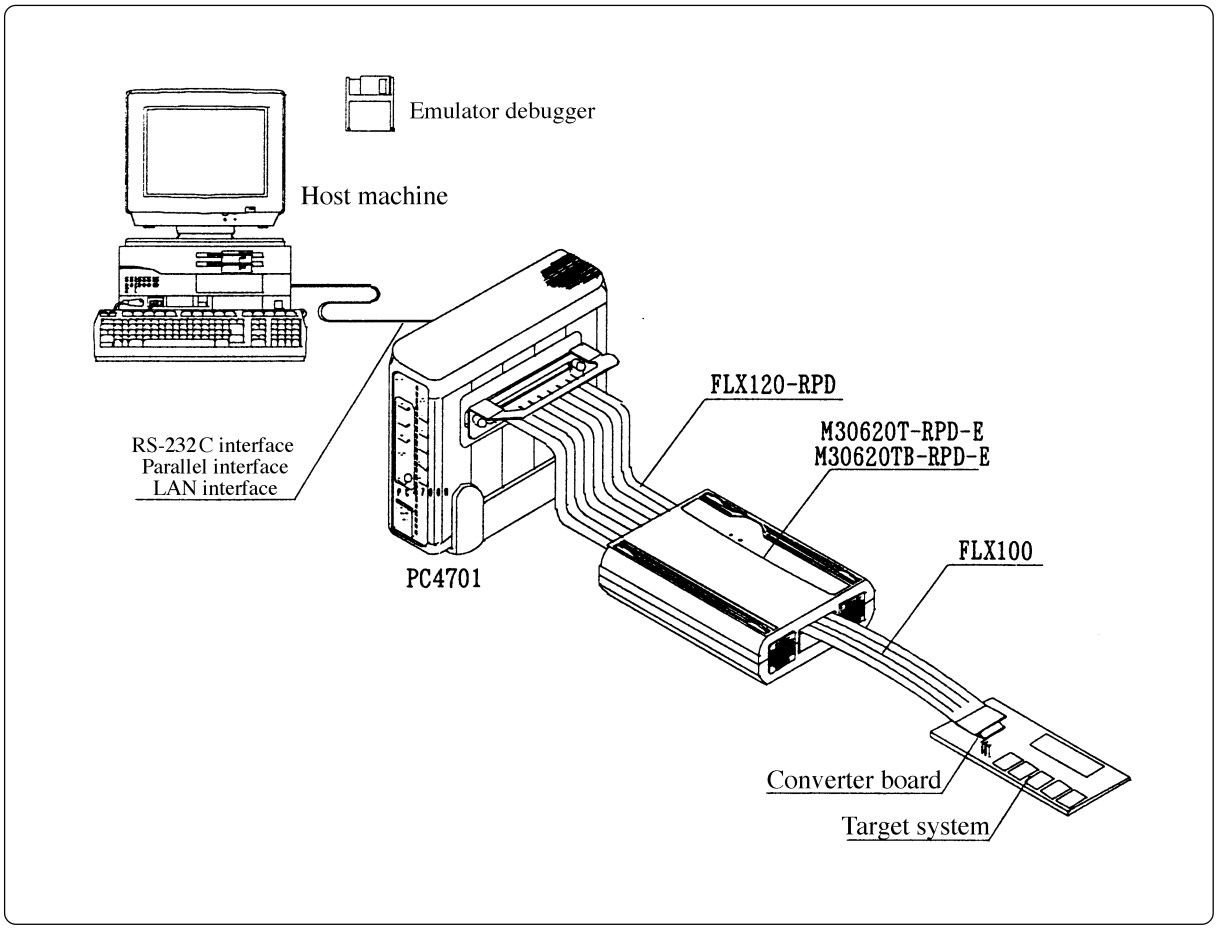


Figure 2.1 System configuration

Following products (1) to (4) are attached to M30620T-RPD-E/M30620TB-RPD-E.

(1) Emulation pod (M30620T-RPD-E/M30620TB-RPD-E)

This emulation pod contains emulation memory and debug functions.

(2) Flexible cable (FLX120-RPD)

This 120-pin flexible cable connects the PC4701 and the emulation pod.

(3) Flexible cable (FLX100)

This 100-pin flexible cable connects the emulation pod and the target system.

(4) Converter board (FLX-100LCC)

This board is connected to a socket for 100LCC on the target system.

Chapter 3. Specifications

Table 3.1 lists the specifications of M30620T-RPD-E and M30620TB-RPD-E.

Table 3.1 Specifications of M30620T-RPD-E and M30620TB-RPD-E

Item		Description	
Usable emulator		PC4701HS, PC4701L, PC4700H and PC4700L	
Usable MCU		M16C/62 Group MCUs	
Usable MCU modes		(1) Single-chip mode (2) Memory expansion mode (3) Microprocessor mode	
Evaluation MCU type		M30622SFP	
Emulation pod clock	M30620T-RPD-E	Main clock (Xin): 10MHz Sub-clock (Xcin): 32.768kHz	
	M30620TB-RPD-E	Main clock (Xin): 16MHz Sub-clock (Xcin): 32.768kHz	
Maximum operating frequency of emulation pod	M30620T-RPD-E	Vcc=5.0V	16MHz, 1-wait 10MHz, 0-wait
		Vcc=3.0V	10MHz, 1-wait 5MHz, 0-wait
	M30620TB-RPD-E	Vcc=5.0V	16MHz (Other than expansion mode 2) 10MHz (Expansion mode 2)
Power supply range	M30620T-RPD-E	2.7 to 5.5V	
	M30620TB-RPD-E	4.8 to 5.2V	
Emulation memory		1MB	
Stack capacity used for emulator		Up to 8 bytes	
Number of intermediate cycles in run-time debug		16-byte dump : Approx. 312 BCLK cycle 16-byte fill : Approx. 283 BCLK cycle	
Power supply to emulation pod	M30620T-RPD-E	1. Supplied from an emulator. 2. The operating voltage of the emulation pod is determined by detecting the supply voltage of the target system. When no target system is connected, or when the supply voltage of the target system is more than 5.0V, the operating voltage is 5.0V.	
	M30620TB-RPD-E	1. Supplied from an emulator 2. The operating voltage of the emulation pod is supplied by the emulator main unit. The operating voltage is 5.0V.	
Connection with target system		See "5.2 Connecting Target System" (page 29).	
Operating temperature range		5 to 35°C (no dew)	
Storage temperature range		-10 to 60°C	
Overseas standards		• EMI standards (FCC part15 Class A) • CE marking (EN55022, EN50082-1)	

Chapter 4. Settings for Target Systems

4.1 Positions of Switches and Jumper Pins

Figure 4.1 shows positions of switches and jumper pins of this product.

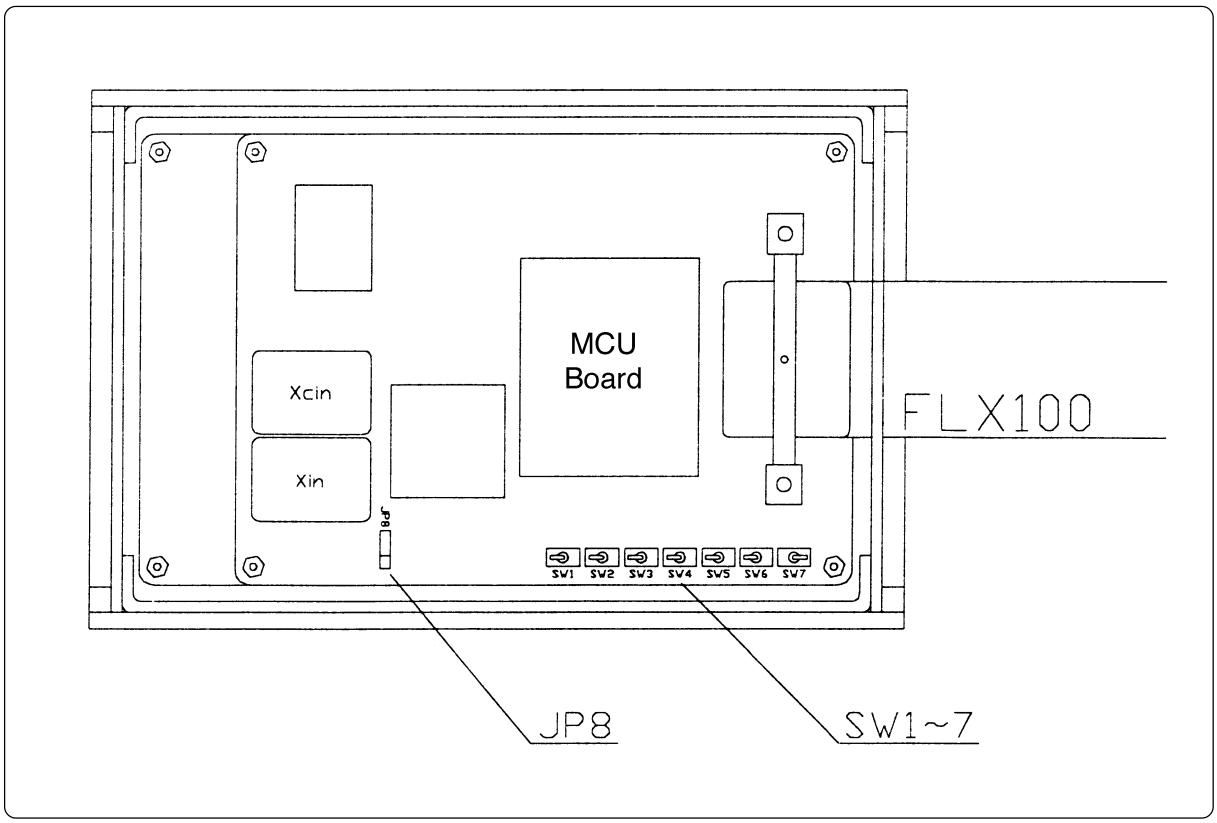
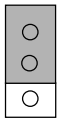
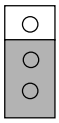


Figure 4.1 Positions of switches

4.2 Settings

To debug target systems with this product, set the switches in this product. Tables 4.1-4.4 give lists of switch settings.

Table 4.1 Jumper Switch (JP) settings

Function	JP No.	JP Settings	
A/D input group selection	JP8	ON  OFF To Use A/D input group selection	ON  OFF Not to use A/D input group selection (Factory-setting)

CAUTION

Be sure to turn off the power before setting the switches. Otherwise, the internal circuits may be damaged.

Table 4.2 Switch (SW) settings

Signal	SW#	Setting
PORT/X_{CIN} ($P8_7$)	SW1	To use Port $P8_7$: PORT ($P8_7$) / X_{CIN} / PORT (Factory-setting). To use X_{CIN} terminal: PORT ($P8_7$) / X_{CIN} / X_{CIN}
$P8_6/X_{COUT}$	SW2	To use Port $P8_6$: $P8_6$ / X_{COUT} / $P8_6$ (Factory-setting). To open: $P8_6$ / X_{COUT}. To use X_{COUT} terminal: $P8_6$ / X_{COUT} / X_{COUT}
X_{OUT}	SW3	To open: OPEN / X_{OUT} / OPEN (Factory-setting). To connect X_{OUT} terminal: OPEN / X_{OUT} / X_{OUT}
$P5_5/\overline{HOLD}$ $P5_7/\overline{RDY}$	SW4	With pullup resistor ($\overline{HOLD}/\overline{RDY}$): H / OPEN / H (Factory-setting). Without pullup resistor: H / OPEN / OPEN
CNV_{SS}	SW5	To pull down 33kΩ: L / H / L (Factory-setting). To leave unconnected: L / H. To pull up 33kΩ: L / H / H
BYTE	SW6	To pull down 33kΩ: 16 / 8 / 16 (Factory-setting). To leave unconnected: 16 / 8. To pull up 33kΩ: 16 / 8 / 8
P70/71	SW7	With pullup resistor: H / OPEN / H. Without pullup resistor: H / OPEN / OPEN (Factory-setting)

CAUTION

Be sure to turn off the power before setting the switches. Otherwise, the internal circuits may be damaged.

If you are using the device in expansion mode 2, please set the switches and jumpers as shown in Table 4.3 (M30620T-RPD-E) and Table 4.4 (M30620TB-RPD-E).

The emulation pods generally have a two-layer board. The switches for expansion mode 2 are on the lower board, and the upper board must therefore be removed for the switches to be set.

Table 4.3 M30620T-RPD-E Switch (SW) settings

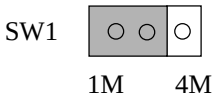
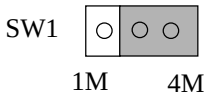
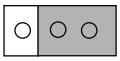
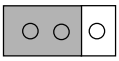
Function	SW No.	SW Settings	
Expansion mode 2	SW1	 Other than expansion mode 2 (Factory-setting)	 Expansion mode 2

Table 4.4 M30620TB-RPD-E Jumper (JP) settings

Function	JP No.	JP Settings	
Expansion mode 2	JP8	A18 4M JP8 1M  Other than expansion mode 2 (Factory-setting)	A18 4M JP8 1M  Expansion mode 2

CAUTION

Be sure to turn off the power before setting the switches. Otherwise, the internal circuits may be damaged.

4.3 Procedure for Setting Oscillation Frequency

If you are using the emulation pod's internal oscillator, see (1) below. If you are using the target system's oscillator, see (2) below.

(1) Using emulation pod's oscillator

M30620T-RPD-E and M30620TB-RPD-E are available with two types of internal oscillator circuits:

- OSC-3 oscillator circuit board (preinstalled)

  M30620T-RPD-E: 10MHz
  M30620TB-RPD-E: 16MHz
- OSC-2 oscillator circuit board (bare board)

a. OSC-3 Oscillator circuit board

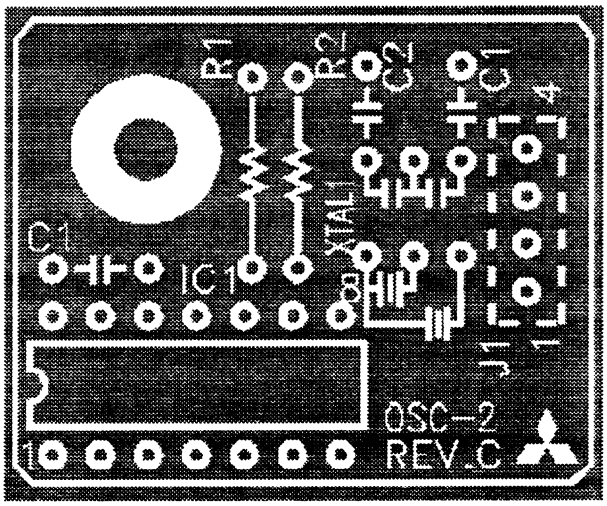
M30620T-RPD-E and M30620TB-RPD-E are equipped with 10MHz and 16MHz internal oscillator circuit boards, respectively. If you are running M30620T-RPD-E/M30620TB-RPD-E at these speeds, you can use the OSC-3 oscillator circuit boards that they are shipped with.

b. OSC-2 oscillator circuit board

M30620T-RPD-E and M30620TB-RPD-E are supplied with an oscillator circuit bare board (connector pin mounting).

If you are using M30620T-RPD-E or M30620TB-RPD-E with internal oscillation frequencies other than those permitted by the standard OSC-3 oscillator circuit board, create the desired oscillator circuit on the OSC-2 bare board and replace the OSC-3 board with the OSC-2 board.

Figure 4.2 shows the external dimensions and connector pin layout of the OSC-2 oscillator circuit board. Figure 4.3 shows the OSC-2 circuit. Use the circuit constants recommended by the maker of the oscillator circuit.



J1－4 ：GND

J1－3 ：Oscillator output

J1－2 ：GND

J1－1 ：Vcc

Figure 4.2 External view of oscillator bare board OSC-2 and connector pin assignments

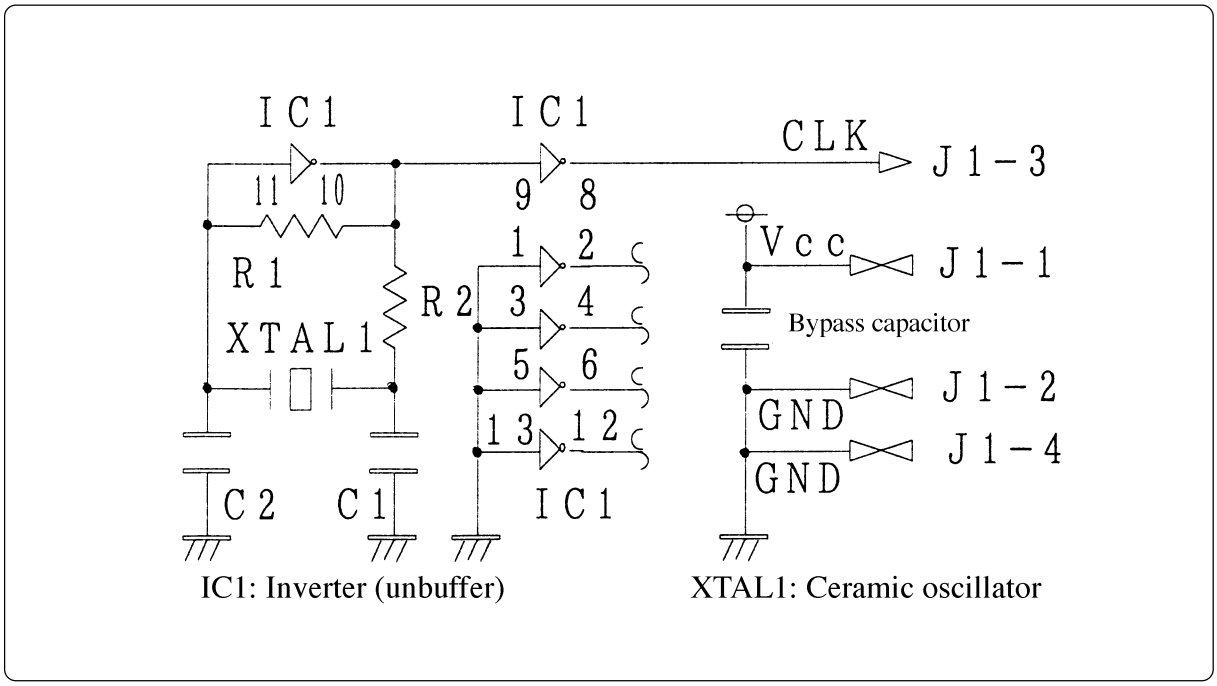


Figure 4.3 Circuit of oscillator board OSC-2

Figure 4.4 shows how to replace the oscillation board.

a. Remove the screw locking the oscillation board in place.

b. Lift the board directly up and out of the product.

c. Plug the J1 connector of the new oscillation board into the J7 connector on the M30620T-PRT board.

d. Lock the board to the M30620T-PRT board with the screw.

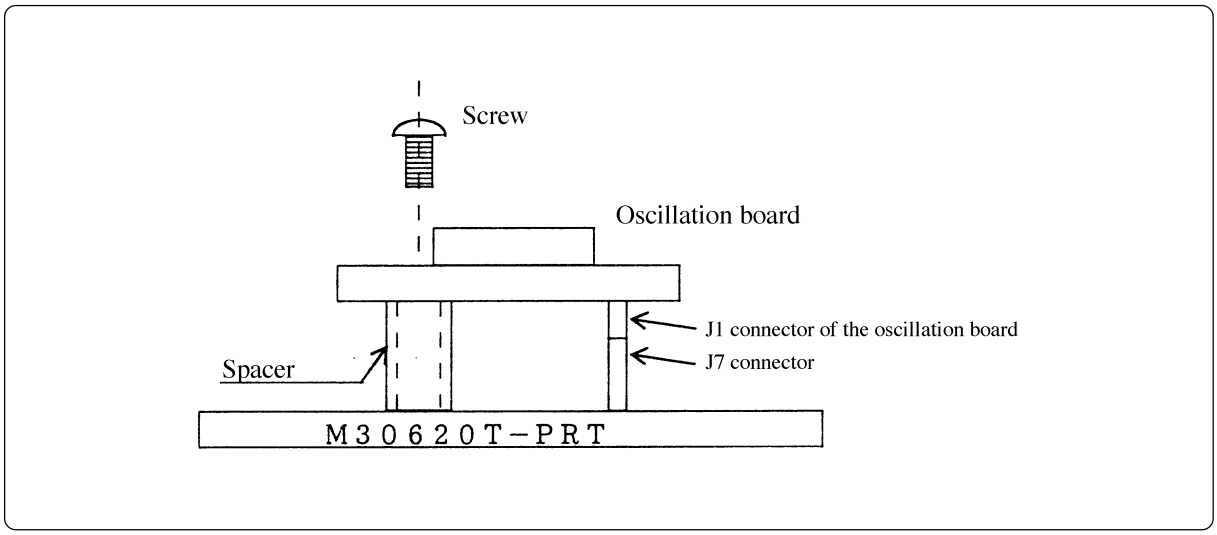


Figure 4.4 Replacing oscillator board

(2) Using target system's oscillator

a. To operate the emulator with an external clock, construct the oscillation circuit shown in Figure 4.5 in the target system and input the oscillation output 40-60% duty (within the operating range of the emulator's MCU) into the Xin (Xcin) pin.

b. Make note of the fact that in the oscillation circuit shown in Figure 4.6 where a resonator is connected between the Xin (Xcin) and Xout (Xcout) pins, oscillation does not occur because a flexible cable, buffer IC and other devices are used between the evaluation MCU and the target system.

c. Use the PD30 emulator debugger to set CLK to EXT. For details, see the user's manual of the PD30 emulator debugger.

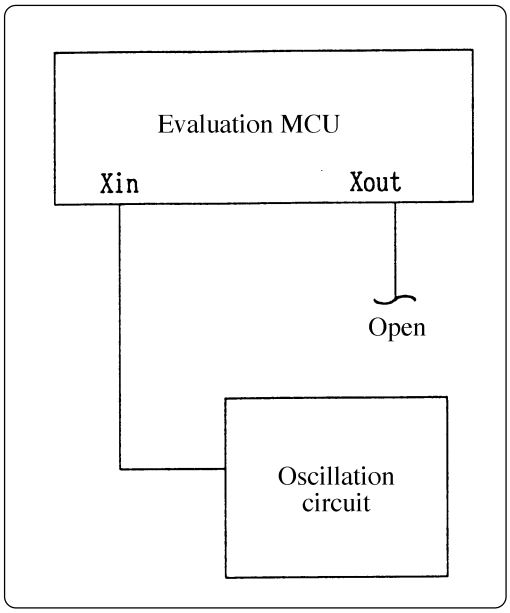


Fig. 4.5 External oscillator circuit

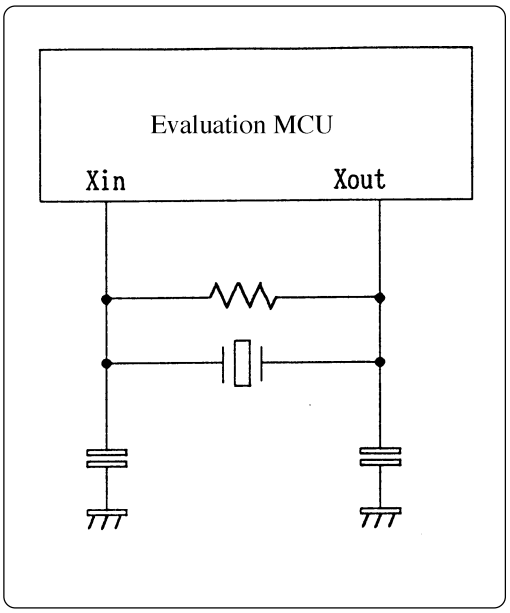


Fig. 4.6 Circuit for no oscillation in this pod

4.4 Procedure for Setting Switches and Jumper Pins

(1) You must remove the cover of M30620T-RPD-E/M30620TB-RPD-E in order to set the switches and jumper pins. To do so, remove the four screws holding the top cover. There are two screws on each side (see Figure 4.7). Be sure to turn OFF the power before attempting to change the switch and jumper pin settings. If the power is ON, you may damage the circuits.

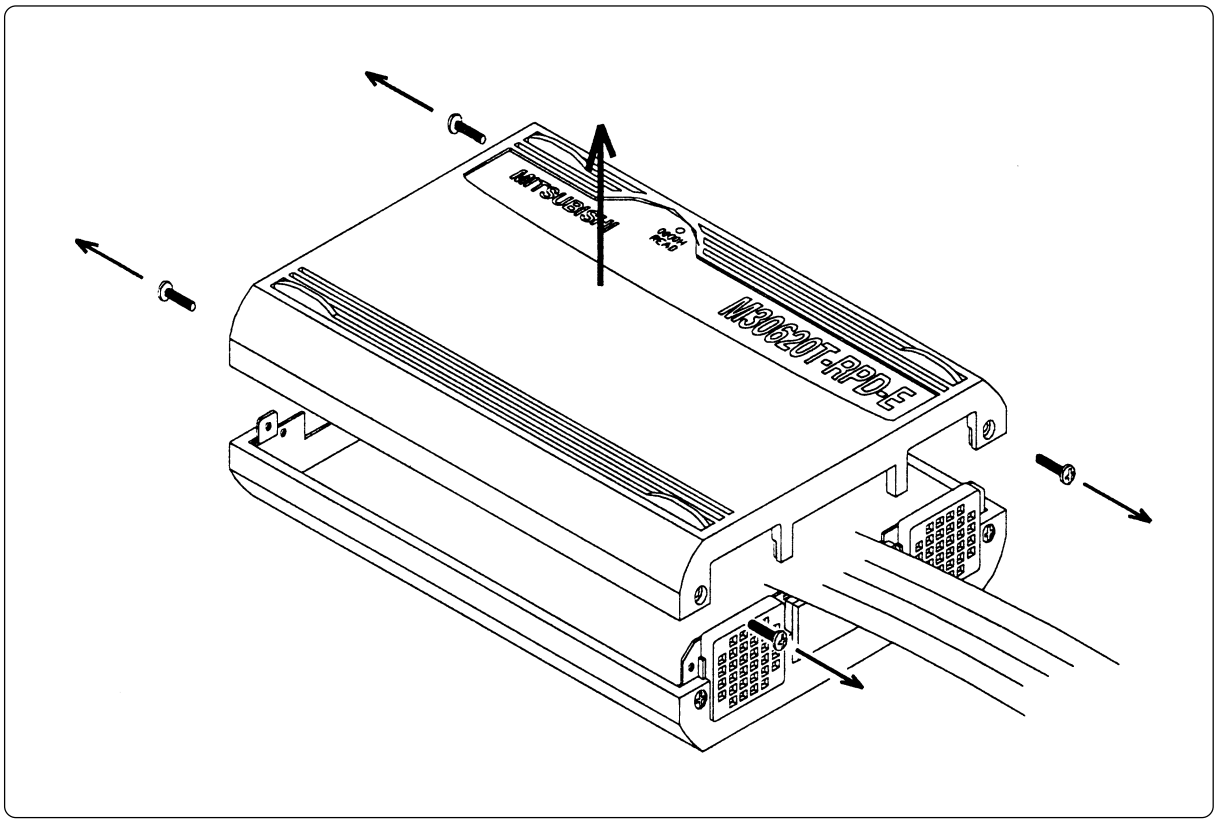


Figure 4.7 Removing M30620T-RPD-E/M30620TB-RPD-E upper cover

(2) After removing the cover, set the jumper pins and switches referring to Table 4.1 for the jumper pin settings and Table 4.2 for the switch settings. To make the switch settings in Table 4.3 and the jumper pin settings in Table 4.4, you must remove the M30620T-PRT board.

(3) After setting the switches, replace the cover by reversing the procedure for its removal.

If you have set the switches as indicated in Table 4.3, replace the M30620T-PRT board before replacing the cover.

1. Replace the M30620T-RPD-E/M30620TB-RPD-E cover.
2. Replace the screws (two on each side) holding the M30620T-RPD-E/M30620TB-RPD-E cover in place.

4.5 Procedure for Writing MCU File

You may need to change the contents of the MCU file, depending on the MCU being developed. The MCU file is in the same directory as the emulator debugger. The file name is M30600.MCU for the M16C/60, 61 groups, or M30620.MCU for the M16C/62 group.

The MCU file contains the following information: SFR area, internal RAM area, internal ROM area, and firmware file name. Set these according to the MCU being developed. Use your editor to edit the MCU file.

0	SFR area starting address
3FF	SFR area ending address
400	Internal RAM starting address
2BFF	Internal RAM ending address
F0000	Internal ROM starting address
FFFFF	Internal ROM ending address
M30620B	Firmware file name (Do not edit.)

Chapter 5. Method of Connection

5.1 Connecting Emulator Main Unit

Use the FLX120-RPD 120-pin flexible cable to connect the emulator main unit and this product. Figure 5.1 shows how to connect the emulator main unit and FLX120-RPD.

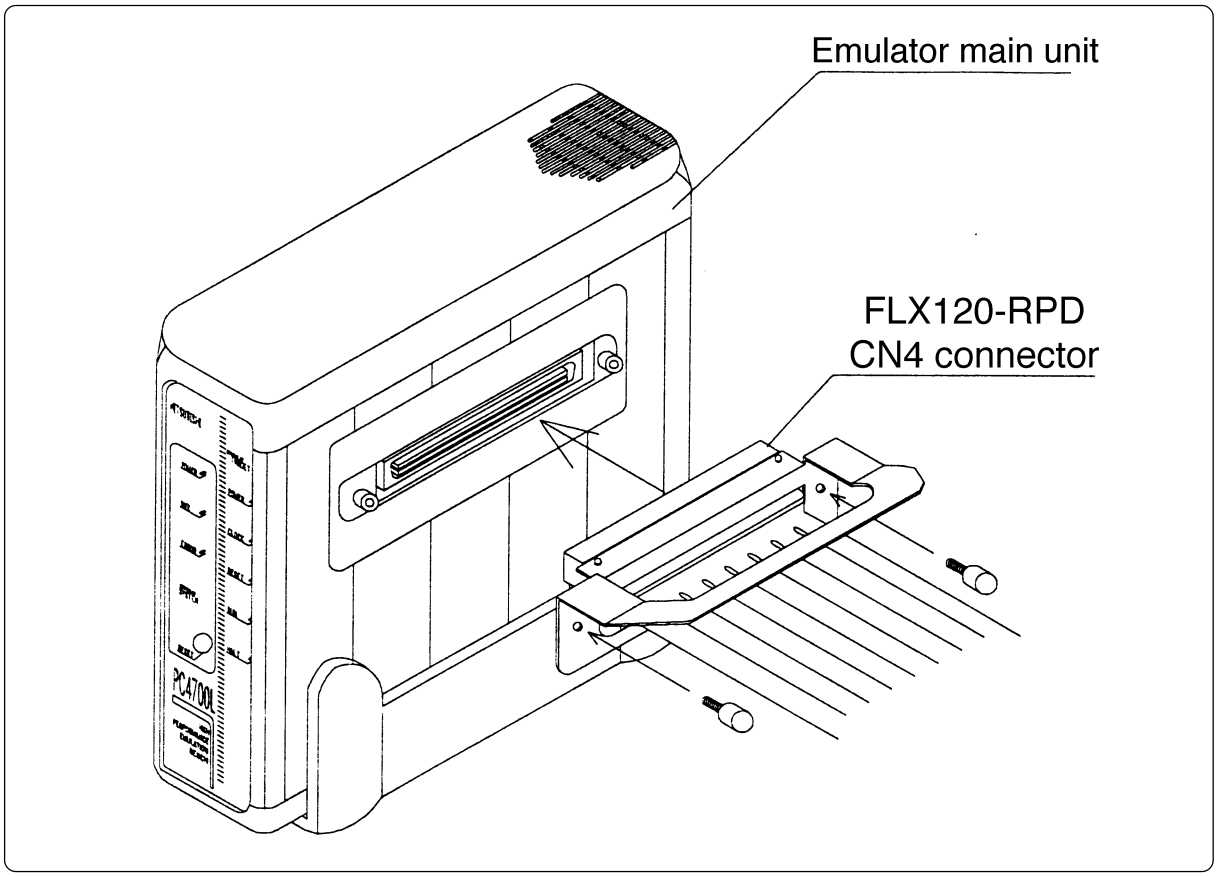


Figure 5.1 Connecting emulator main unit and FLX120-RPD

Connect FLX120-RPD with M30620T-RPD-E/M30620TB-RPD-E. Figure 5.2 shows how to connect M30620T-RPD-E/M30620TB-RPD-E and FLX120-RPD.

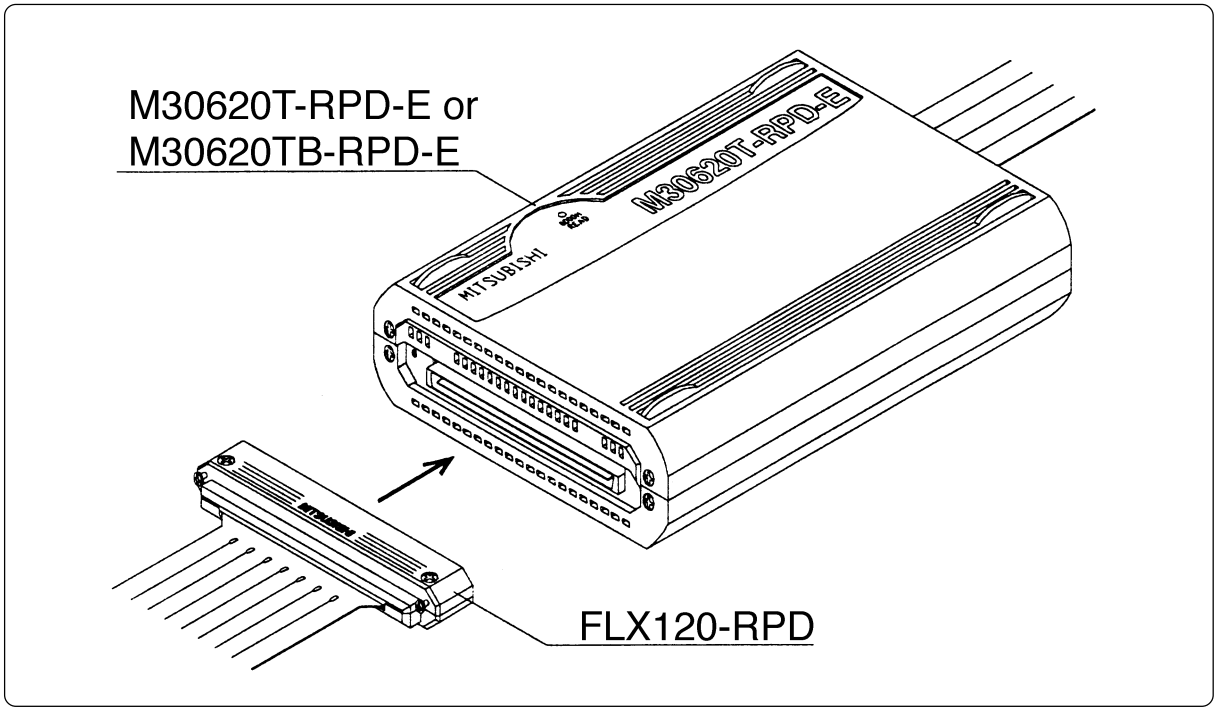


Figure 5.2 Connecting M30620T-RPD-E/M30620TB-RPD-E and FLX120-RPD

CAUTION

Be sure to turn off the power before making connections. Otherwise, the internal circuits may be damaged.

5.2 Connecting Target System

Figure 5.3 shows how to connection to target systems. For more details, refer to "Mitsubishi Microcomputer Development Support Tools - Accessory Guide".

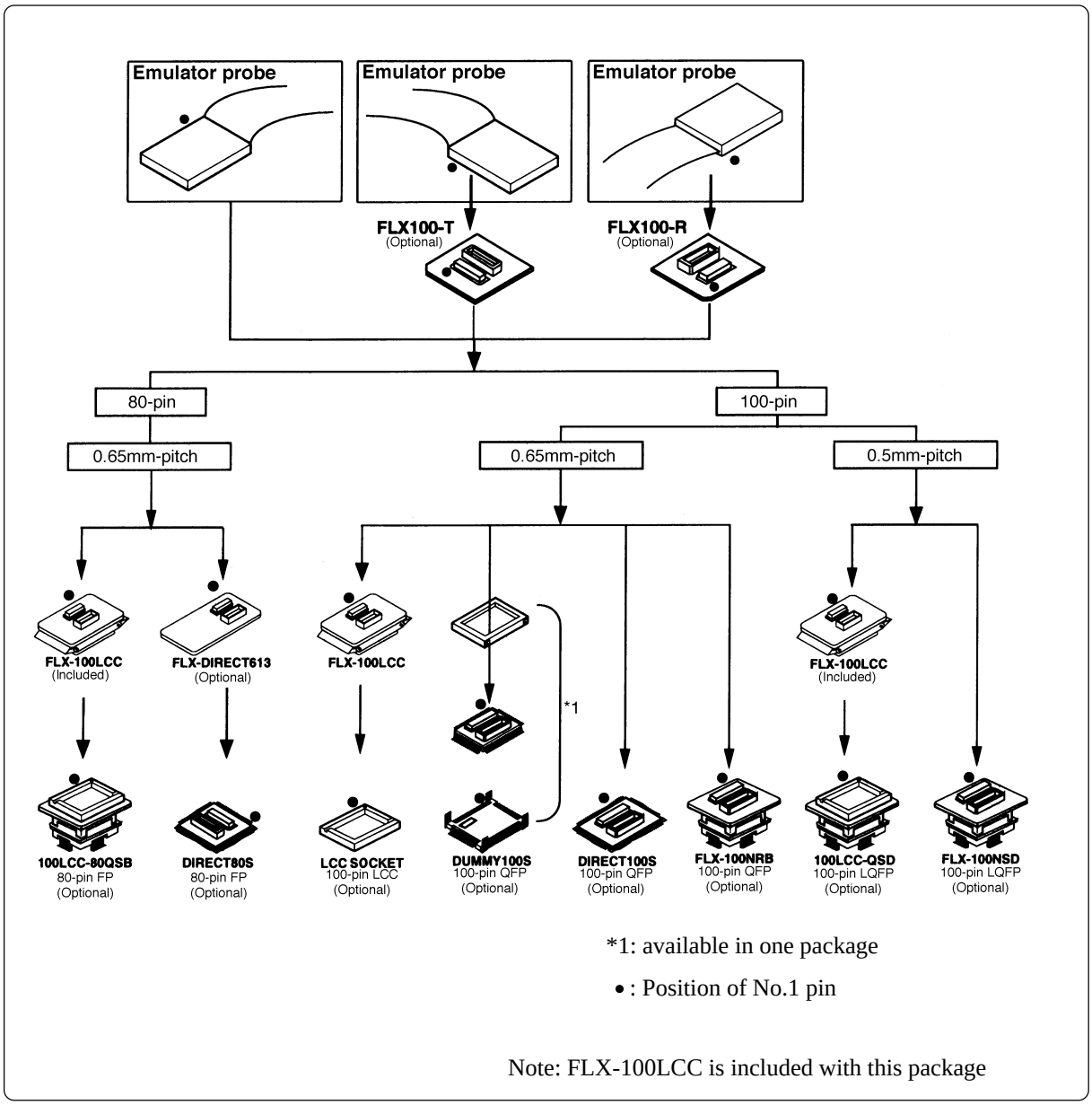


Figure 5.3 Connection to target systems

CAUTION

(1) Be sure to turn off the power before making connections. Otherwise, the internal circuits may be damaged.

(2) The small connectors of FLX100 and FLX-100LCC are guaranteed for only 20 insertion/removal iterations.

Chapter 6. Constraints

6.1 M30620T-RPD-E and M30620TB-RPD-E Constraints

(1) BRK instruction

The BRK instruction cannot be used.

(2) Software and hardware breaks

a. Do not set simultaneous software and hardware breaks.

b. Do not use software breaks for areas for which the MAP setting is EXT.

(3) Using multiplex bus with PC4701L/PC4700L emulator

You can only use Fetch as a hardware break condition for the multiplex bus area.

(4) Using address match interrupts

a. Do not set a software break at the same address as you have set an address match interrupt.

b. Do not set a hardware break within the 4 bytes leading up to the address at which an address match interrupt is invoked.

c. When the address at which an address match interrupt occurs is achieved by one-step execution, the address match interrupt processing and the first command on return from the interrupt are executed simultaneously.

(5) Software resets

Do not use software resets.

(6) Watchdog function

If using the watchdog function, you can only use program execution. If you want to use debugger functions other than program execution, disable the watchdog function.

(7) Developing MCUs with 256K ROM and 20K RAM

The following three settings must be made:

a. Set the processor mode register 1 (address 5H), bit 3 (PM13) in your program to "1".

b. Use the emulator debugger to change the work area to 5C00H.

c. If using expansion mode 1, change the MAP setting for address 4000H to 5FFFH to INT.

(8) Using expansion modes 1 and 2

The realtime trace function and RAM monitor function are not correctly displayed for areas where there is bank switching in expansion modes 1 and 2 (duplex areas).

(9) Using AD input group selection function

When using the AD input group selection function, you cannot specify whether to use the AD input for the 24 bits $P0_0$ to $P0_7$, $P2_0$ to $P2_7$, and $P10_0$ to $P10_7$. The respective bits in ports P0, P2, and P10 are linked, inhibiting AD input. For example, if you set $P0_0$ so that AD input is not used, $P2_0$ and $P10_0$ also cannot be used for AD input.

6.2 M30620TB-RPD-E Constraints

(1) Operating voltage

Use with a target system with an operating voltage of 4.8 to 5.2V.

(2) Operating frequency in expansion mode 2

The maximum operating frequency in expansion mode 2 is 10.0MHz.

(3) Using with PC4701L/PC4700L emulator

The maximum operating frequency is 14.0MHz when using the PC4701L/PC4700L with the emulator.

6.3 M30620T-RPD-E Constraints

(1) Maximum operating frequency

Target system with 5.0V power supply and 0-wait:

10.0MHz (Use M30620TB-RPD-E for frequencies greater than 10.0MHz.)

Chapter 7. Operation Timing

7.1 Bus Timing (Separate Bus)

Tables 7.1, 7.2 and Figure 7.1 show bus timing when using separate bus.

Table 7.1 Bus timing (separate bus, Vcc=5.0V)

Symbol	Parameter	M30622SFP [ns]		M30620T-RPD-E M30620TB-RPD-E [ns]	
		Min.	Max.	Min.	Max.
td(BCLK-AD)	Address output delay time	-	25	-	40
th(BCLK-AD)	Address output hold time (BCLK)	4	-	4	-
th(RD-AD)	Address output hold time ($\overline{RD}$)	0	-	0	-
th(WR-AD)	Address output hold time ($\overline{WR}$)	0	-	0	-
td(BCLK-CS)	Chip-select output delay time	-	25	-	40
th(BCLK-CS)	Chip-select output hold time (BCLK)	4	-	4	-
td(BCLK-ALE)	ALE signal output delay time	-	25	-	25
th(BCLK-ALE)	ALE signal output hold time	-4	-	-4	-
td(BCLK-RD)	$\overline{RD}$ signal output delay time	-	25	-	30
th(BCLK-RD)	$\overline{RD}$ signal output hold time	0	-	0	-
td(BCLK-WR)	$\overline{WR}$ signal output delay time	-	25	-	40
th(BCLK-WR)	$\overline{WR}$ signal output hold time	0	-	0	-
td(BCLK-DB)	Data output delay time (BCLK)	-	40	-	45
th(BCLK-DB)	Data output hold time (BCLK)	4	-	4	-
td(DB-WR)	Data output delay time ($\overline{WR}$)	(Note 1)	-	(Note 1)	-
th(WR-DB)	Data output hold time ($\overline{WR}$)	0	-	0	-

Note 1. Compute bus timing according to BCLK frequency. Use the below formula.

td(DB-WR) = tcyc/2 - 40 (no wait)

td(DB-WR) = tcyc - 40 (with wait)

Table 7.2 Bus timing (separate bus, Vcc=3.0V)

Symbol	Parameter	M30622SFP [ns]		M30620T-RPD-E [ns]	
		Min.	Max.	Min.	Max.
td(BCLK-AD)	Address output delay time	-	60	-	80
th(BCLK-AD)	Address output hold time (BCLK)	4	-	4	-
th(RD-AD)	Address output hold time ($\overline{RD}$)	0	-	0	-
th(WR-AD)	Address output hold time ($\overline{WR}$)	0	-	0	-
td(BCLK-CS)	Chip-select output delay time	-	60	-	80
th(BCLK-CS)	Chip-select output hold time (BCLK)	4	-	4	-
td(BCLK-ALE)	ALE signal output delay time	-	60	-	60
th(BCLK-ALE)	ALE signal output hold time	-4	-	-4	-
td(BCLK-RD)	$\overline{RD}$ signal output delay time	-	60	-	80
th(BCLK-RD)	$\overline{RD}$ signal output hold time	0	-	0	-
td(BCLK-WR)	$\overline{WR}$ signal output delay time	-	60	-	80
th(BCLK-WR)	$\overline{WR}$ signal output hold time	0	-	0	-
td(BCLK-DB)	Data output delay time (BCLK)	-	80	-	95
th(BCLK-DB)	Data output hold time (BCLK)	4	-	4	-
td(DB-WR)	Data output delay time ($\overline{WR}$)	(Note 1)	-	(Note 2)	-
th(WR-DB)	Data output hold time ($\overline{WR}$)	0	-	0	-

Note 1. Compute bus timing according to BCLK frequency. Use the below formula.

td(DB-WR) = tcyc/2 - 80 (no wait)

td(DB-WR) = tcyc - 80 (with wait)

Note 2. Compute bus timing according to BCLK frequency. Use the below formula.

td(DB-WR) = tcyc/2 - 88 (no wait)

td(DB-WR) = tcyc - 88 (with wait)

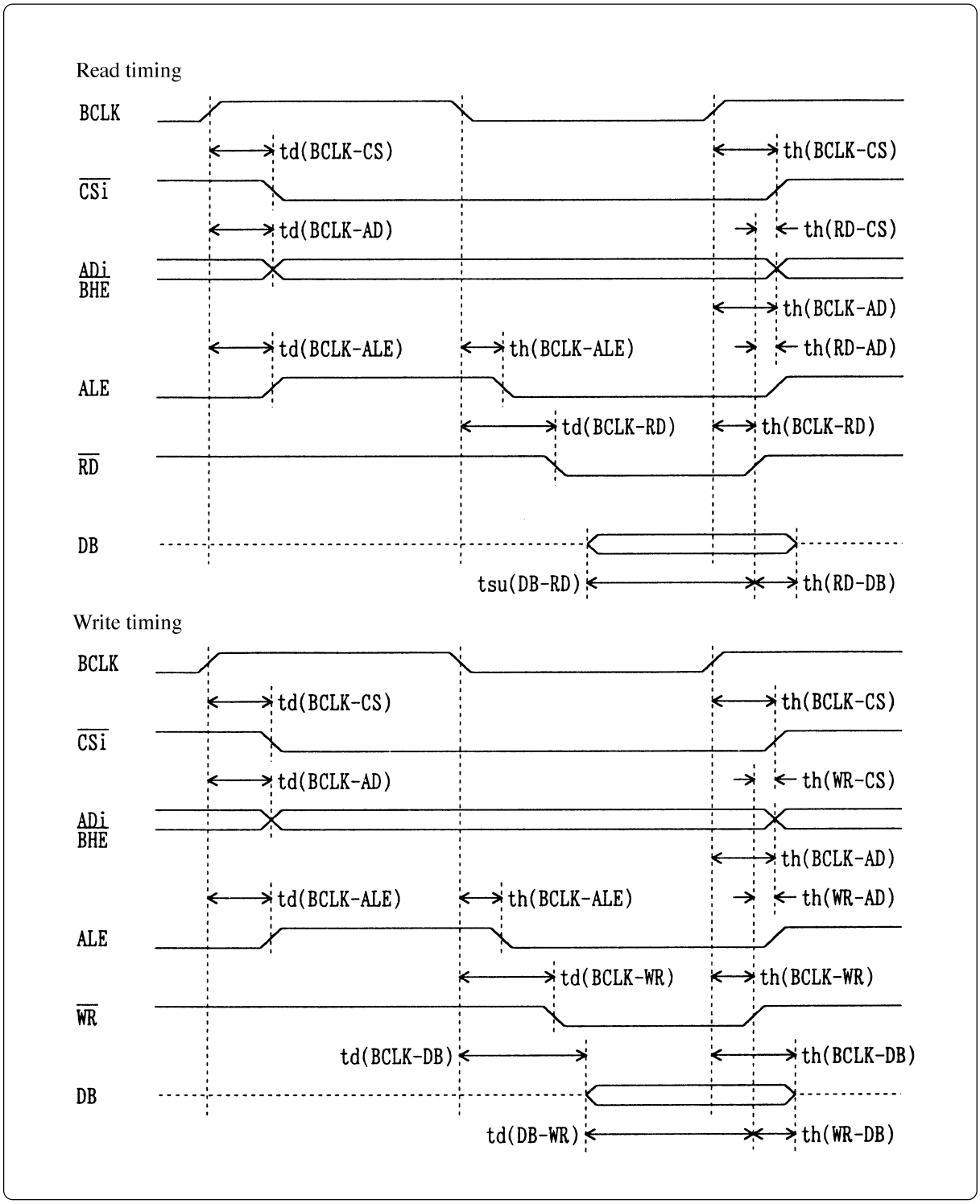


Figure 7.1 Bus timing (separate bus)

7.2 Bus Timing (Multiplex Bus)

Tables 7.3, 7.4 and Figure 7.2 show bus timing when using multiplex bus.

Table 7.3 Bus timing (multiplex bus, Vcc=5.0V)

Symbol	Parameter	M30622SFP [ns]		M30620T-RPD-E M30620TB-RPD-E [ns]	
		Min.	Max.	Min.	Max.
td(BCLK-AD)	Address output delay time	-	25	-	40
th(BCLK-AD)	Address output hold time (BCLK)	4	-	4	-
th(RD-AD)	Address output hold time ($\overline{RD}$)	(Note 1)	-	(Note 1)	-
th(WR-AD)	Address output hold time ($\overline{WR}$)	(Note 1)	-	(Note 1)	-
td(BCLK-CS)	Chip-select output delay time	-	25	-	40
th(BCLK-CS)	Chip-select output hold time (BCLK)	4	-	4	-
th(RD-CS)	Chip-select output hold time ($\overline{RD}$)	(Note 1)	-	(Note 1)	-
th(WR-CS)	Chip-select output hold time ($\overline{WR}$)	(Note 1)	-	(Note 1)	-
td(BCLK-RD)	$\overline{RD}$ signal output delay time	-	25	-	40
th(BCLK-RD)	$\overline{RD}$ signal output hold time	0	-	0	-
td(BCLK-WR)	$\overline{WR}$ signal output delay time	-	25	-	40
th(BCLK-WR)	$\overline{WR}$ signal output hold time	0	-	0	-
td(BCLK-DB)	Data output delay time (BCLK)	-	40	-	45
th(BCLK-DB)	Data output hold time (BCLK)	4	-	4	-
td(DB-WR)	Data output delay time ($\overline{WR}$)	(Note 1)	-	(Note 2)	-
th(WR-DB)	Data output hold time ($\overline{WR}$)	(Note 1)	-	(Note 1)	-
td(BCLK-ALE)	ALE signal output delay time (BCLK)	-	25	-	25
th(BCLK-ALE)	ALE signal output hold time (BCLK)	-4	-	-4	-

Note 1. Compute bus timing according to BCLK frequency. Use the below formula.

$th(RD-AD) = tcyc/2 + 4$

$th(WR-AD) = tcyc/2 + 4$

$th(RD-CS) = tcyc/2 + 4$

$th(WR-CS) = tcyc/2 + 4$

$td(DB-WR) = tcyc \times 3/2 - 40$

$th(WR-DB) = tcyc/2 + 4$

Note 2. Compute bus timing according to BCLK frequency. Use the below formula.

$td(DB-WR) = tcyc \times 3/2 - 41$

Table 7.4 Bus timing (multiplex bus, Vcc=3.0V)

Symbol	Parameter	M30622SFP [ns]		M30620T-RPD-E [ns]	
		Min.	Max.	Min.	Max.
td(BCLK-AD)	Address output delay time	-	60	-	80
th(BCLK-AD)	Address output hold time (BCLK)	4	-	4	-
th(RD-AD)	Address output hold time ($\overline{RD}$)	(Note 1)	-	(Note 1)	-
th(WR-AD)	Address output hold time ($\overline{WR}$)	(Note 1)	-	(Note 1)	-
td(BCLK-CS)	Chip-select output delay time	-	60	-	80
th(BCLK-CS)	Chip-select output hold time (BCLK)	4	-	4	-
th(RD-CS)	Chip-select output hold time ($\overline{RD}$)	(Note 1)	-	(Note 1)	-
th(WR-CS)	Chip-select output hold time ($\overline{WR}$)	(Note 1)	-	(Note 1)	-
td(BCLK-RD)	$\overline{RD}$ signal output delay time	-	60	-	80
th(BCLK-RD)	$\overline{RD}$ signal output hold time	0	-	0	-
td(BCLK-WR)	$\overline{WR}$ signal output delay time	-	60	-	80
th(BCLK-WR)	$\overline{WR}$ signal output hold time	0	-	0	-
td(BCLK-DB)	Data output delay time (BCLK)	-	80	-	95
th(BCLK-DB)	Data output hold time (BCLK)	4	-	4	-
td(DB-WR)	Data output delay time ($\overline{WR}$)	(Note 1)	-	(Note 2)	-
th(WR-DB)	Data output hold time ($\overline{WR}$)	(Note 1)	-	(Note 1)	-
td(BCLK-ALE)	ALE signal output delay time (BCLK)	-	60	-	60
th(BCLK-ALE)	ALE signal output hold time (BCLK)	-4	-	-4	-

Note 1. Compute bus timing according to BCLK frequency. Use the below formula.

th(RD-AD) = tcyc/2

th(WR-AD) = tcyc/2

th(RD-CS) = tcyc/2

th(WR-CS) = tcyc/2

td(DB-WR) = tcyc x 3/2 - 80

th(WR-DB) = tcyc/2

Note 2. Compute bus timing according to BCLK frequency. Use the below formula.

td(DB-WR) = tcyc x 3/2 - 91

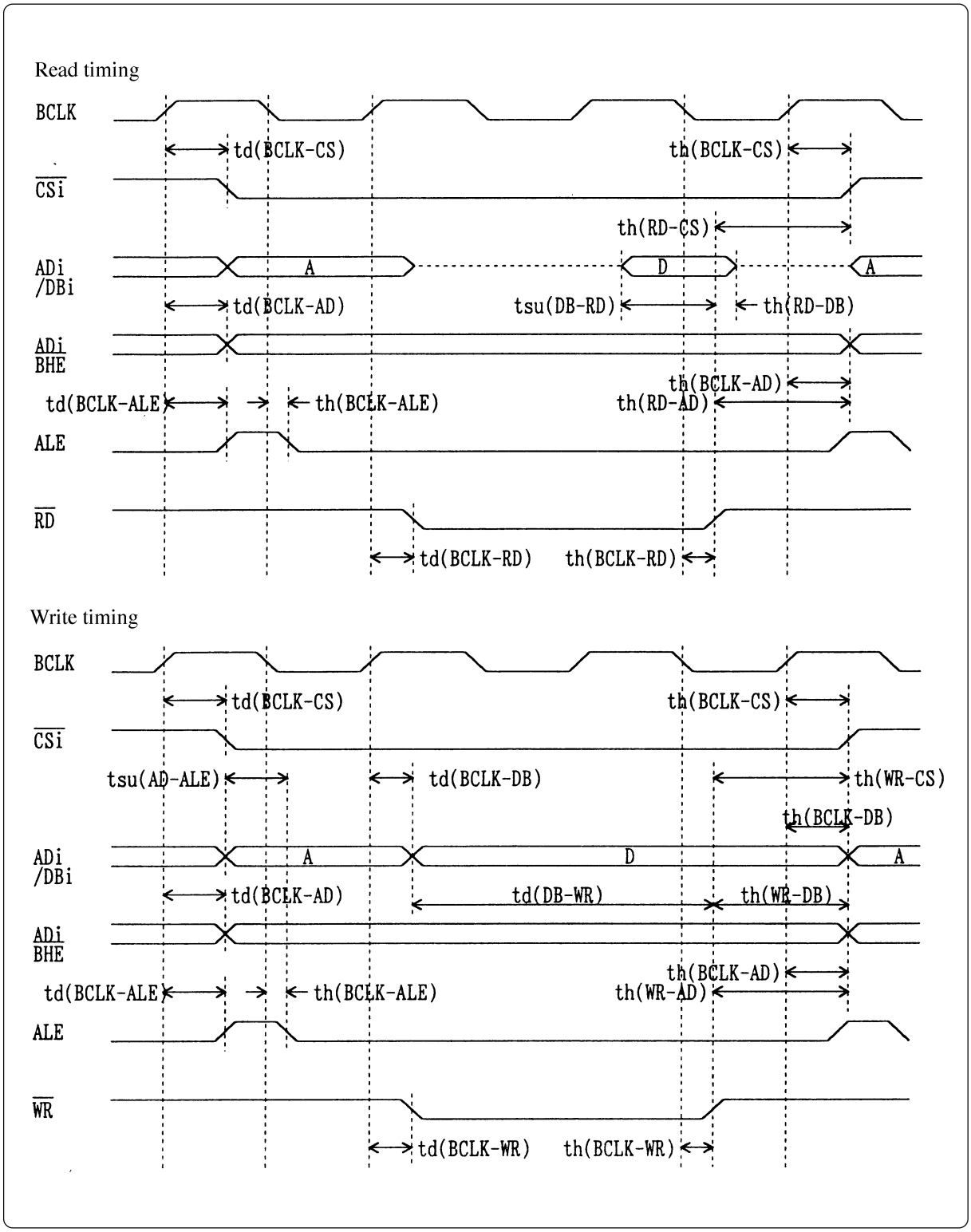


Figure 7.2 Bus timing (multiplex bus)

7.3 Timing Requirements

Tables 7.5, 7.6 and Figure 7.3 show timing requirements. Refer to Figure 7.1 on page 34 about data input setup time and data input hold time.

Table 7.5 Timing Requirements (Vcc=5.0V)

Symbol	Parameter	M30622SFP [ns]		M30620T-RPD-E [ns]	
		Min.	Max.	Min.	Max.
tsu(DB-RD)	Data input setup time	40	-	55	-
tsu(RDY-BCLK)	$\overline{\text{RDY}}$ input setup time	30	-	47	-
tsu(HOLD-BCLK)	$\overline{\text{HOLD}}$ input setup time	40	-	(Note 1)	-
th(RD-DB)	Data input hold time	0	-	0	-
th(BCLK-RDY)	$\overline{\text{RDY}}$ input hold time	0	-	0	-
th(BCLK-HOLD)	$\overline{\text{HOLD}}$ input hold time	0	-	0	-

Note 1. Compute bus timing according to BCLK frequency. Use the below formula.

th(HOLD-BCLK) = tcyc + 11

Table 7.6 Timing Requirements (Vcc=3.0V)

Symbol	Parameter	M30622SFP [ns]		M30620T-RPD-E [ns]	
		Min.	Max.	Min.	Max.
tsu(DB-RD)	Data input setup time	80	-	110	-
tsu(RDY-BCLK)	$\overline{\text{RDY}}$ input setup time	60	-	91	-
tsu(HOLD-BCLK)	$\overline{\text{HOLD}}$ input setup time	80	-	(Note 1)	-
th(RD-DB)	Data input hold time	0	-	0	-
th(BCLK-RDY)	$\overline{\text{RDY}}$ input hold time	0	-	0	-
th(BCLK-HOLD)	$\overline{\text{HOLD}}$ input hold time	0	-	0	-

Note 1. Compute bus timing according to BCLK frequency. Use the below formula.

th(HOLD-BCLK) = tcyc + 22

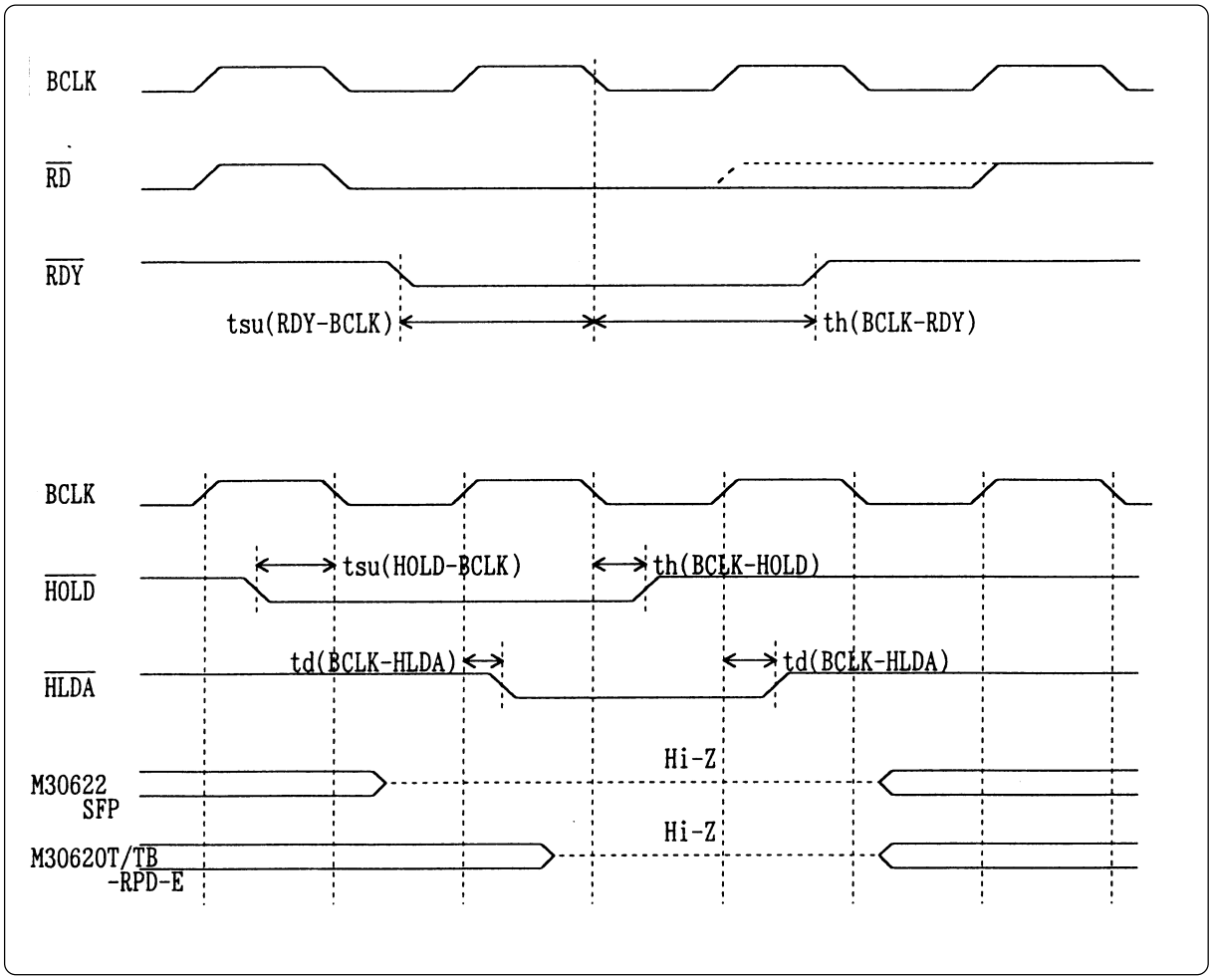


Figure 7.3 Timing Requirements

CAUTION

(1) Regardless of the BYTE terminal input level or the port $P4_0$ to $P4_3$ function select bits of the processor mode register 0, $P0_0$ to $P5_2$ are all high-impedance.

(2) M30620T-RPD-E and M30620TB-RPD-E change to high-impedance a half-cycle after the actual MCU (see Figure 7.3).

Chapter 8. Electrical Characteristics

Tables 8.1 shows IC electrical characteristics of user's interface.

Table 8.1 Electrical characteristics of M60074-0111FP ($P0_0$ - $P5_7$, 5.0V)

Symbol	Parameter	Standard values			Unit
		Min.	Typ.	Max.	
VIL	'L' level input voltage	0	-	1.35	V
VIH	'H' level input voltage	3.85	-	5.5	V
VOL	'L' level output voltage	-	-	0.05	V
VOH	'H' level output voltage	4.95	-	-	V
IOL	'L' level output current	8	-	-	mA
IOH	'H' level output current	-	-	-8	mA
IIL	'L' level input current	-1	-	+1	µA
IIH	'H' level input current	-1	-	+1	µA
IOZL	Off state 'L' level output current	-1	-	+1	µA
IOZH	Off state 'H' level output current	-1	-	+1	µA
CIO	Input/output terminal capacity	-	7	15	pF

Chapter 9. Maintenance

If dust or dirt collects on any equipment of your emulation system, wipe it off with a dry soft cloth. Do not use thinner or other solvents because these chemicals can cause the equipment's surface coating to separate.

Chapter 10. Guarantee

10.1 Guarantee

The emulation pod presented here has passed Mitsubishi's product inspection. If your emulation pod becomes faulty within 12 months after purchase while being used under good conditions by observing the Precautions for Safety described in Chapter 1 here, Mitsubishi will repair the fault free-of-charge. (This provision does not apply to emulation pods leased to you.) When repair is required, contact your nearest of Mitsubishi office or its distributor.

10.2 Repair Provisions

If a fault in your equipment falls under one of the following categories, the fault will be corrected by replacing the entire equipment instead of repairing, depending on the severity of fault:

• Faulty or broken mechanical section

• Flaw, separation, or rust in coated or plated section

• Flaw or crack in plastic section

• Fault or breakage caused by incorrect use or unauthorized repair or modification

• Heavily damaged electric circuits due to shorting of power supply, overvoltage, or overcurrent

• Crack in printed circuit board or burned-down patterns

• Broad range of fault making replacement less expensive than repairing

• Unlocatable or unidentifiable fault

Chapter 11. Troubleshooting

11.1 When M30620T-RPD-E/M30620TB-RPD-E Does Not Work Properly

(1) Emulator main unit cannot be powered up.

☐ Check to see if the AC power cord is firmly plugged into the receptacle.

☐ Check to see if the AC power 3P-2P converting connector is firmly connected.

(2) The M30620T-RPD-E/M30620TB-RPD-E does not start up when the target system is connected with the PC4701 system. (The Error LED of the emulator main unit lights up.)

☐ Check (1) described above.

☐ Check whether the emulator main unit and the FLX120-RPD are firmly connected.

☐ Check whether the FLX120-RPD and the M30620T-RPD-E/M30620TB-RPD-E is firmly connected.

☐ Check whether the M30620T-RPD-E/M30620TB-RPD-E and the target system are firmly connected.

☐ Check whether the power and GND are supplied to the target system.

☐ Check whether switches of the M30620T-RPD-E/M30620TB-RPD-E is properly set. (Refer to chapter 4. for setting switches.)

☐ Check whether the $\overline{\text{RESET}}$ pin and $\overline{\text{NMI}}$ pin are held 'HIGH' when the target system is connected.

☐ Check whether the $\overline{\text{HOLD}}$ pin and $\overline{\text{RDY}}$ pin are held 'HIGH' when in microprocessor or memory expansion mode.

☐ Check whether the oscillator circuit of the target system is oscillating correctly when using a target's oscillator.

☐ Check whether proper firmware is downloaded in the emulator main unit. (Refer to the user's manual of the emulator debugger about how to download firmware.)

(3) If the PC4701 system does not pass all self-checks (excluding when an target system error occurs), there is the possibility of trouble in the system. In such case, contact the place of purchase.

Please take note that self-check should be executed under the following conditions.

a. The target system is not connected.

b. The Switch SW5 is set to 'L' position, SW6 to '16' (See Chapter 4).

When the condition does not improve even if you check the items above, troubles described below are considered.

(1) Trouble of the evaluation MCU

(2) Trouble of the M30620T-RPD-E/M30620TB-RPD-E

(3) Trouble of the PC4701 emulator main unit

11.2 How to Request for Repair

If your M30620T-RPD-E/M30620TB-RPD-E is found faulty after checking items in Section 11.1, follow the procedure below to send your product for repair.

Customers

Something found faulty

Write down the necessary information in the 'M30620T-RPD-E/M30620TB-RPD-E Repair Request Sheet' attached hereto, then send it along with the M30620T-RPD-E/M30620TB-RPD-E for repair to the distributor or nearest office of Mitsubishi Electric.

Make sure that information in the 'M30620T-RPD-E/M30620TB-RPD-E Repair Request Sheet' is written in as much detail as possible to facilitate repair.

Distributors

Contents of fault checked

After checking the contents of fault, the distributor should please send the faulty M30620T-RPD-E/M30620TB-RPD-E along with the Repair Request Sheet to Mitsubishi Electric.

Mitsubishi Electric Semiconductor Systems Corporation, Repaired by

When the faulty M30620T-RPD-E/M30620TB-RPD-E is repaired, it will be returned to the customer at the earliest convenience.

CAUTION

When sending your M30620T-RPD-E/M30620TB-RPD-E for repair, use the packing box and cushion material supplied with the M30620T-RPD-E/M30620TB-RPD-E when delivered to you and specify handling caution for it to be handled as precision equipment.

If packing of your product is not complete, it may be damaged during transportation. When you pack your product in a bag, make sure to use conductive polyvinyl supplied with the M30620T-RPD-E/M30620TB-RPD-E (usually a blue bag). When you use other bags, they may cause a trouble on your product because of static electricity.

If you transport the M30620T-RPD-E/M30620TB-RPD-E with some other means for an unavoidable reason, make sure that it is packaged carefully as precision equipment.

Appendix A. External Dimensions

A.1 External Dimensions of M30620T-RPD-E/M30620TB-RPD-E

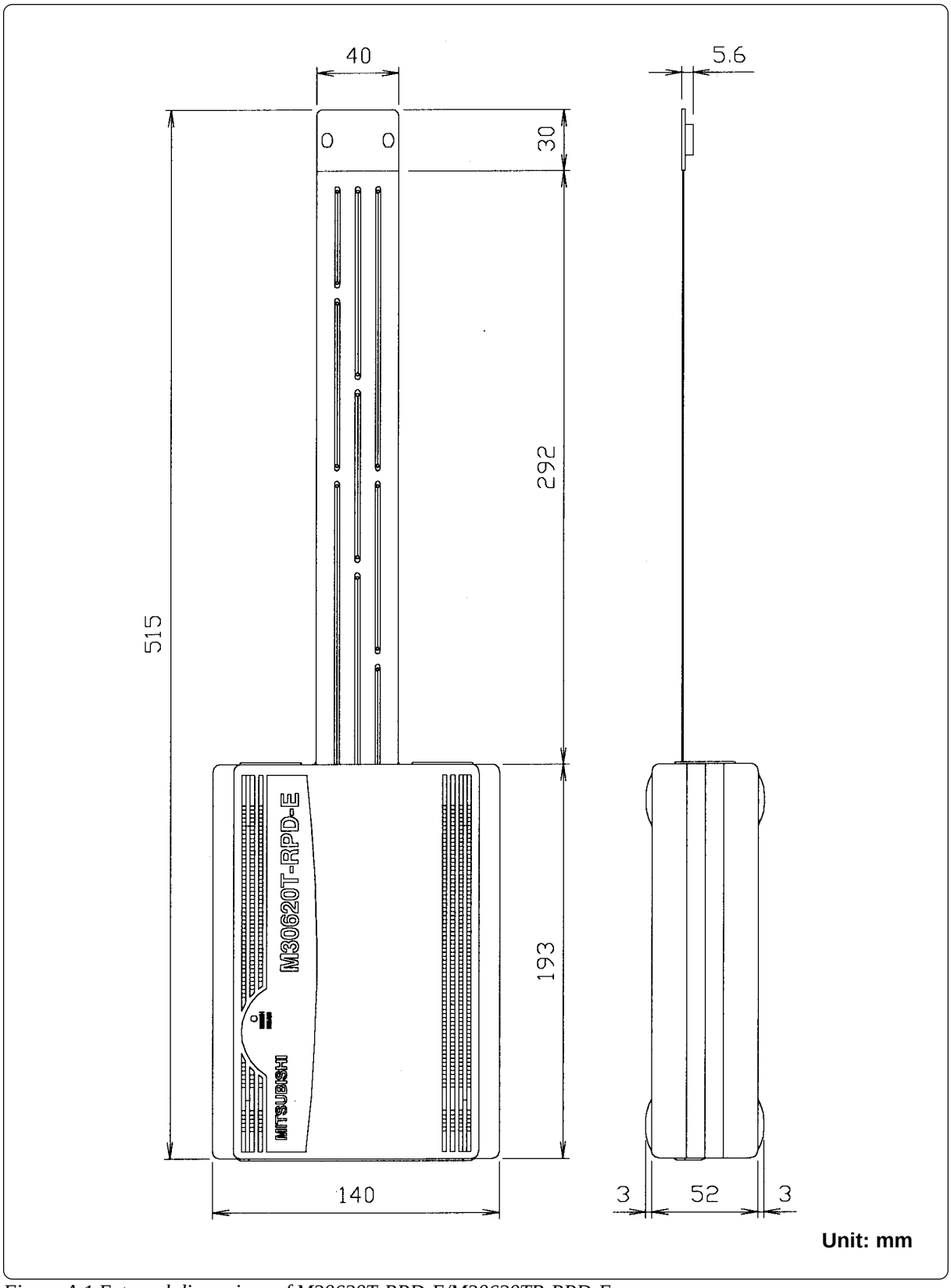


Figure A.1 External dimensions of M30620T-RPD-E/M30620TB-RPD-E

A.2 External Dimensions of FLX-100LCC

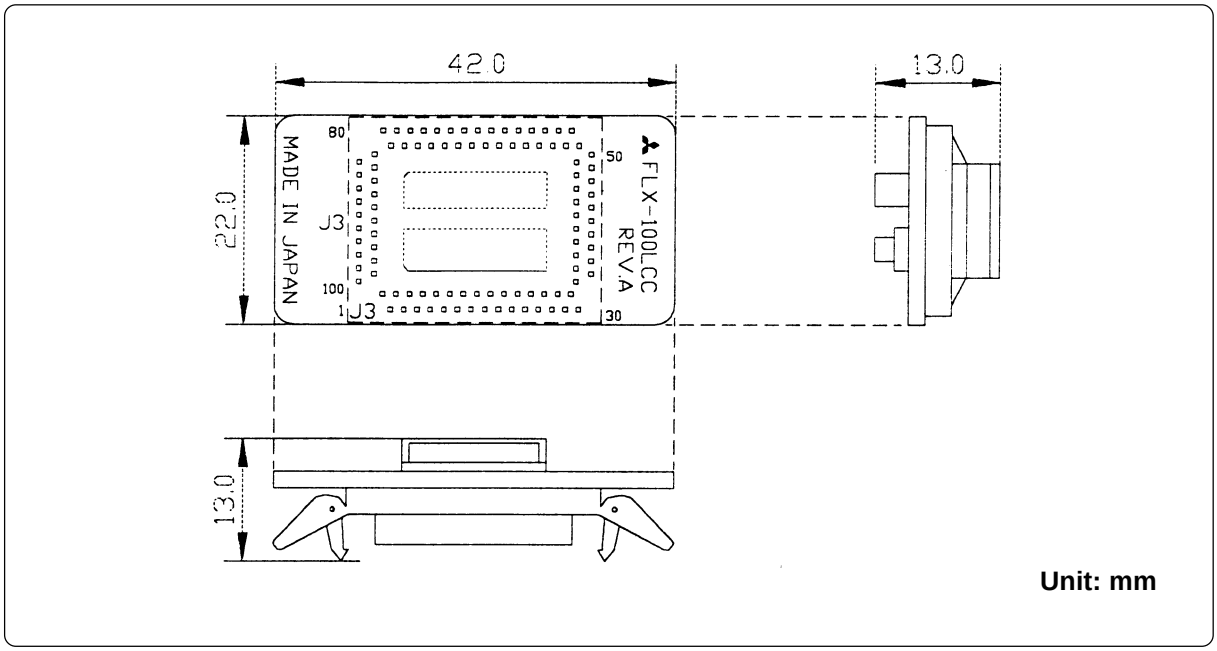


Figure A.2 External dimensions of FLX-100LCC

Appendix B. Connection Diagrams

Figures B.1 and B.2 show the connection diagrams of M30620T-RPD-E/M30620TB-RPD-E. These connection diagrams mainly show the interface section with a target system, and the circuits which are not connected to the target system such as the emulator's control system are omitted.

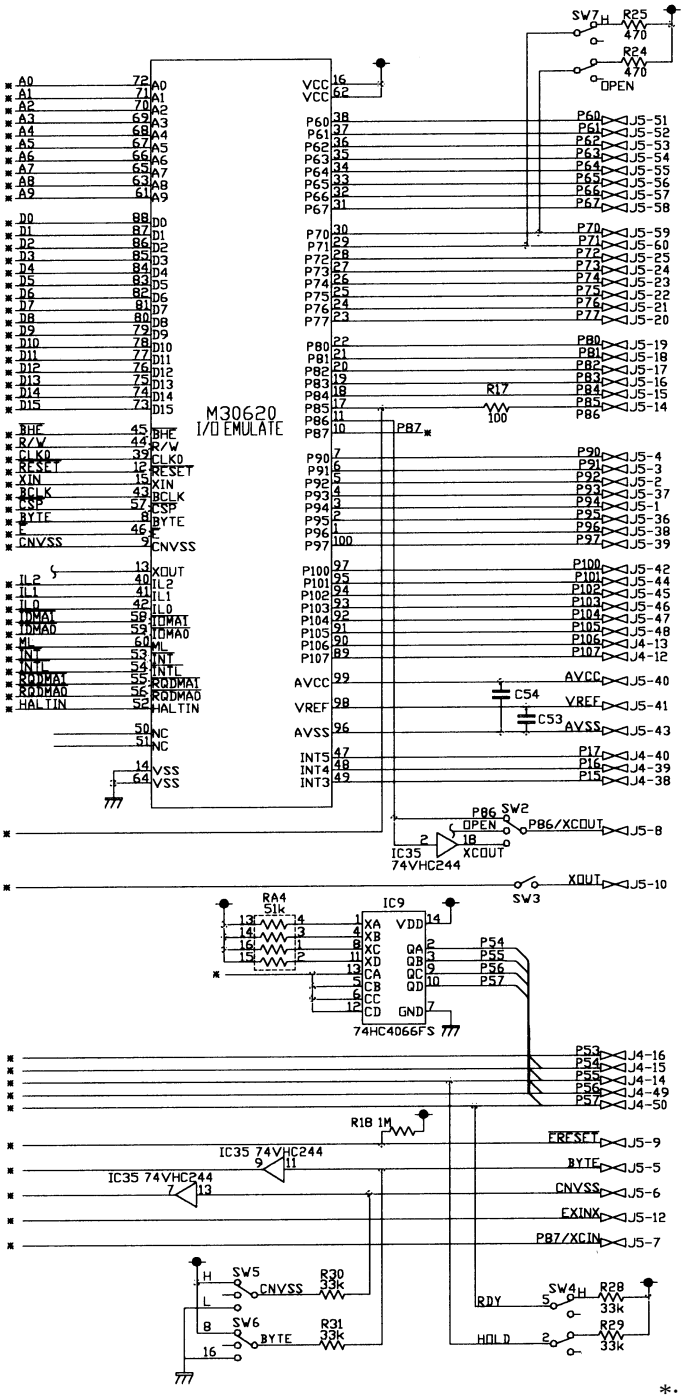


Figure B.1 Connection diagram of M30620T-RPD-E/M30620TB-RPD-E (1/2)

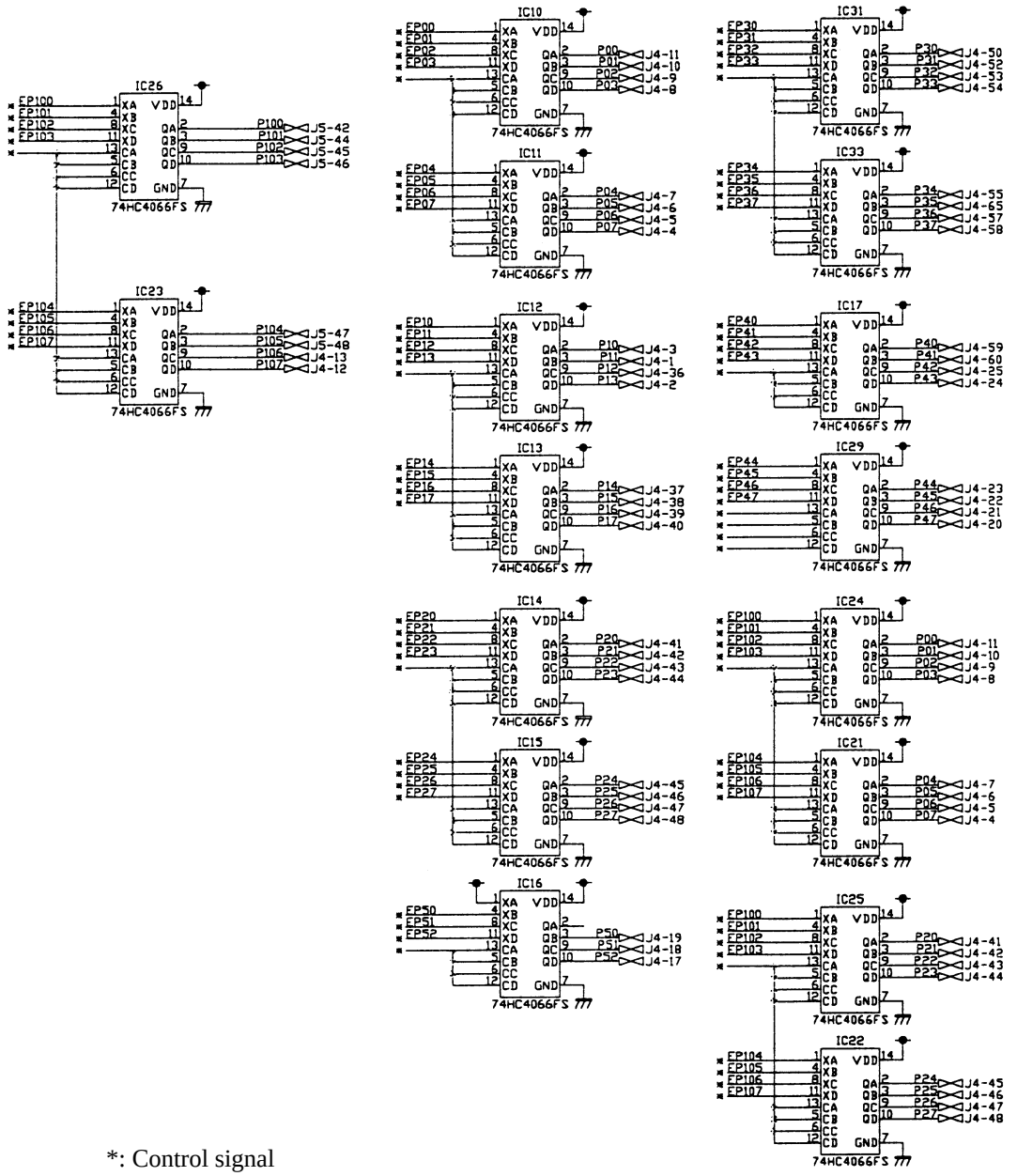


Figure B.2 Connection diagram of M30620T-RPD-E/M30620TB-RPD-E (2/2)

M30620T-RPD-E/M30620TB-RPD-E Repair Request Sheet

Date :___/___/___(Total Pages)

To Distributor:

Contact Address	Product Information
Company :	Product name :M30620T-RPD-E/M30620TB-RPD-E
Department :	Serial number :
Responsible person :	Date of purchase :
Phone :	Target MCU :
FAX :	Frequency : MHz
Address :	Voltage : V

Symptoms : Write in detail by itemizing each observed symptom.

Occurrence frequency
- Regularly
- Frequency( )

Cause of fault : Write your estimated cause of fault or the sequence of operation when the fault occurred.

Operating environment :

Emulator: _____ Serial number : _____

LAN option [☐ installed / ☐ not installed]

Serial number of PC4701LAN : _____

Host machine : _____ OS & version : _____ V . .

Emulator debugger : _____ V . .

Remarks : If you have any special request such as your desired delivery period, write it down here.

Technical Support Communication Sheet

Date :___/___/____(Total Pages)

To Distributor:

Contact Address	Product Information
Company :	Emulator :
Department :	Serial number :
Responsible person :	Emulation Pod :
Phone :	Serial number :
FAX :	Emulator debugger :
Address :	Version :
	Serial number :
	- - - -
	Host machine :
	OS & version :
	Target MCU :
Message :	

If this form does not have sufficient space, use another sheet of paper to write your information.